FLOOR CLEANING MACHINE WITH DUST CONTROL APPARATUS AND ASSOCIATE METHOD OF USE

BACKGROUND OF INVENTION

Floor cleaning machines often create dust as a by-product of normal operations. For example, burnishers are used to remove one or more layers of wax or other coatings from a hard surface floor, such as composition tile. A rotating pad in the burnisher is in contact with the built-up wax on the floor. As the pad rotates, one or more layers of wax are removed from the floor, restoring the shine to the surface. Dust is normally created as a by-product of this wax removal process. The dust can be troublesome as it settles on almost everything in the surrounding environment. For example, in a grocery store, the dust accumulates on canned goods, bottles, produce, and shelving. In an office, the dust accumulates on furniture, bookshelves, word processing equipment, and other office equipment. In a warehouse, the dust accumulates on boxes, racks and other products. Cleaning personnel spend extra time dusting after a floor has been burnished with prior art burnishers that do not have any kind of dust control apparatus. The industry has recognized a need for burnishers with some type of dust control apparatus.

Pioneer Eclipse® of Sparta, N.C. (www.pioneer-eclipse.com) sells at least two burnishers with dust control apparatus. One model with dust control apparatus is called the Speed Star™ and the other is called the Revolution™.

The Speed Star™ burnisher from Pioneer Eclipse® attempts to collect dust in a dust bag. A non-floating scoop is rigidly attached to the underside of the pad housing above the pad driver and the pad. The scoop is curved and feeds up through the pad housing to a throat that attaches to the dust bag. The dust bag can be removed from the throat to be emptied. A propane-powered engine drives a belt, which causes the pad to rotate. The belt connects to a drive pulley. A pulley cover isolates the belt and the drive pulley. In other words, there is no inlet into the pad housing to facilitate airflow through the scoop and throat and into the dust bag. As a result, there is only a modest amount of dust collected in the cloth dust bag.

The Revolution™ burnisher from Pioneer Eclipse® attempts to collect dust in a removable filter, instead of a cloth dust bag. A non-floating scoop is rigidly attached to the underside of the pad housing above the pad driver and the pad. The scoop is curved and feeds up through the pad housing into a plastic throat, which feeds into a filter housing. The filter can be removed from the filter housing for cleaning or to be replaced. A propane-powered engine drives a belt, which causes the pad to rotate. The belt connects to a drive pulley on top of the pad housing. In other words, there is no inlet into the pad housing to facilitate airflow through the scoop and the throat into the filter housing. As a result, there is only a modest amount of dust collected in the filter and the filter housing. There is still a need for a floor cleaning machine that does a better job of dust control.

Dust control is also a concern in the design and manufacture of sanders for hardwood floors. The Information Disclosure Statement filed concurrently herewith includes an advertising brochure from Clarke American Sanders entitled "Dust Control Floor Sanders." The brochure has a picture of an orbital sander showing the vacuum fan and a disposable paper filter/collection bag. The apparatus includes a floating skirt to contain dust. The inlet for the dust is positioned on the top of the deck of the sander, not on the side of the sander. This Brochure also pictures a disk sander with a vacuum adapter that connects to any vacuum system with an 1Â½ inch diameter vacuum hose. This sander also has a floating skirt that directs the dust to a pick-up chamber. Again, the inlet or pick-up chamber for the dust is positioned on the top of the deck and not on the side of the sander. Also included in the Information Disclosure Statement, is brochure from Clarke American Sanders entitled "Professional Dust Control Sanding System." This Brochure shows a disk sander with vacuum adapter connected to a portable vacuum cleaner. Again, the inlet for the dust is on the top of the deck of the sander and not on the side of the sander. There still is a need for improved dust control systems in floor cleaning machines.

SUMMARY OF INVENTION

The present invention is a floor cleaning machine with an improved dust control apparatus. This dust control apparatus can also be sold separately as an after-market addition for existing floor cleaning machines that lack any dust control apparatus, or for floor cleaning machines that have inadequate dust control capabilities. This invention is particularly suited for use with propane-powered burnishers that create dust as a by-product during normal operations.

Floor cleaning machines typically have a rotating circular pad in contact with the floor. These pads sometimes travel at relatively high rates of speed, i.e., about 2,000 rpm or more. These pads wear over time and the height of the pad may vary by Â½ inch or more during the useful life of the pad. Because the pads wear down over time and for other reasons, some floor cleaning machines have a floating hoop assembly that is sometimes referred to in the industry as a skirt. The floating hoop assembly helps to contain dust during operation of the machine. The present invention includes a floating scoop attached to the floating hoop assembly so the hoop assembly and the scoop will move up and down in tandem over irregularities in the floor and as the pad wears.

The floating scoop directs at least a portion of the dust away from the pad. The scoop is in communication with a throat and a circular canister. In one embodiment, a removable filter is placed in the circular canister. The dust moves through the scoop, the throat, and into the circular canister, where it swirls in a circular motion around the filter. The circular canister and the filter act as a separator to assist in removal of the entrained dust from the air.

A housing surrounds the pad and also helps to contain the dust. The housing includes a generally vertical sidewall around the outer circumference of the pad. A drive belt passes through an opening in the sidewall of the housing to rotate the pad driver, which is connected to the pad. This opening operates as an air inlet during operation of the floor cleaning machine of the present invention. Unlike the Speed StarÂ□ and the RevolutionÂ□ from Pioneer EclipseÂ®, ambient air passes through this inlet and becomes entrained with particulate (dust). This air with entrained particulate (dust) exits the housing through the scoop on the way to the circular canister. This upper flow path allows a constant stream of air to enter the housing, pick-up dust, exit the housing with the dust and move to the canister where the dust is separated from the air.

The scoop acts as an outlet for the housing. The scoop is in communication with an upper flow path of entrained particulate (dust) and air. The upper flow path is generally defined by the housing and the pad driver. The scoop is also